



Blister Beetles and Alfalfa

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Blister beetles are common in southern and eastern areas of the United States (Figure 1). Of the species that occur in Oklahoma, the most common is the striped blister beetle (*Epicauta occidentalis*). This beetle has several black and orange stripes along the back (Figure 2). All fatalities caused by blister beetle toxicity in horses examined by Oklahoma State University veterinarians have been caused by the striped blister beetle. Several species with spotted, black or gray coloration (Figure 2) are also found in Oklahoma and other areas.

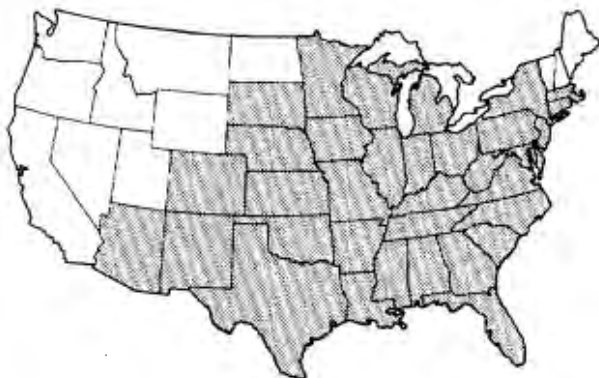


Figure 1. Area of the United States where striped blister beetles have been reported.

All of these beetles contain the blistering agent "cantharidin" in their hemolymph (the blood of insects). Cantharidin is highly toxic when ingested by horses or other livestock and may cause illness and even death in these animals. It is a very stable compound that retains its toxicity to livestock even when dried remains of beetles, that have been killed in the harvesting process, are fed along with forage. Cantharidin is produced only by male blister beetles and is stored until mating. Thus, mating status determines whether females contain the toxin.

Cantharidin may cause irritation to the lining of the stomach, small intestine, bladder and urethra in horses.

Beetle Life Cycle

Blister beetles complete one generation per year. Adult beetles mate and the females lay eggs during the summer in shallow cavities in the soil. These eggs hatch in the fall

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and the larvae immediately begin searching for grasshopper eggs to consume. Grasshopper eggs are laid in clusters of up to 30 or more within 1 to 2 inches of the soil surface during the late summer and fall. Blister beetle larvae devour clusters of eggs, then overwinter in the soil and emerge as adults in late spring or early summer. When infesting alfalfa, beetles prefer to feed on blossoms but will feed on leaves if blossoms are not present. Pigweed, goldenrod, goathead, puncturevine, peanuts, soybeans, and many other plants also serve as hosts for these beetles.

Emergence of adult blister beetles typically occurs after



Figure 2. Black, spotted, striped, and gray blister beetles are representative of the many species in the U.S.



Figure 3. Typical swarm of striped blister beetles found on alfalfa hay.

the first cutting of alfalfa is completed. Striped blister beetles have not been collected by OSU entomologists before May 14 in Oklahoma, and in many years, it is mid-June or later before they become active. Generally, first cutting of Oklahoma alfalfa is in late April or early May. Activity of the adult blister beetle ceases in early fall which should ensure an October cutting free of beetles. Consequently, it is possible for hay producers and buyers to obtain forage harvested at times of the year when there is little chance of beetle infestation.

Avoiding Blister Beetle Contamination

Striped blister beetles are gregarious, and frequently large numbers congregate in small areas of fields (Figure 3). This habit makes them easier to see when harvesting, but it also increases the chances that remains of beetles killed in the harvesting process may be concentrated in a few hay bales or portions of bales unless special precautions are taken.

Blister beetles normally do not migrate long distances. In alfalfa, they are often found within 50 yards of the field margin. Therefore, scouting for blister beetles should be concentrated along field borders. When spraying fields for control of other insect pests, also spray border areas to reduce chances of blister beetle migration.

Blister beetle contaminated hay is almost always the result of beetles being crushed prior to baling. This usually happens when the swather goes through a swarm of beetles. Beetles are killed by the crimper rollers and trapped in the hay. Remains of blister beetles may be concentrated in a small portion of the hay from a field. Beetles are also killed and trapped when forage is driven on before the beetles have had time to escape. If left alone, the vast majority of blister beetles leave alfalfa shortly after cutting. Cutting without using crimpers and avoiding wheel traffic on freshly cut alfalfa are two of the best ways to avoid problems.

Other measures alfalfa producers can take to avoid blister beetles in the hay are:

- Spray entire fields with a short residual insecticide just before harvesting. Spray the fence rows and field borders as well; or,
- Inspect fields shortly before cutting and spray only the infested areas if any are found.

The insecticide Sevin is registered for blister beetle control in alfalfa. It has given good results under Oklahoma conditions. Use Sevin at 0.5 to 1.0 lb active ingredient per acre.

It has a 7-day waiting period before harvest. Methoxychlor is also registered for blister beetle control in alfalfa, and it has a 7-day waiting period before harvest.

In addition to these compounds, other chemicals have been used in controlling blister beetles in alfalfa. Malathion and the Permethrin products (at lower rates) have no waiting period between application and harvest; however, their labels do not list blister beetles as a target pest. Furthermore, the efficacy of these products on blister beetles in Oklahoma has not been thoroughly tested. Parathion has been used effectively for blister beetle control; however, it has a 15-day waiting period before harvest.

Things an Alfalfa Buyer Should Do

- Know your alfalfa supplier.
- Ask producers what precautions were taken to avoid presence of blister beetles in forage.
- Inspect hay before feeding if presence of blister beetles is suspected.
- If feeding small amounts of alfalfa, examine each flake for concentrations of dead blister beetles.
- Purchase hay harvested before May or after September. This will not guarantee a lack of problems with blister beetles but will reduce the risks significantly.
- If symptoms appear, call your veterinarian immediately.

Blister Beetle Poisoning in Horses

Symptoms in horses are dependent on the amount of cantharidin eaten. If a large amount of cantharidin is consumed, a horse may die within 6 hours. If a small amount is consumed, only depression or mild colic (pawing, looking to the side, stretching) may occur. A frequent symptom of cantharidin illness is placing the muzzle in water and playing in the water with the lips and tongue. Severe poisoning may result in low blood calcium and magnesium. These low electrolyte levels may cause stiffness or an exaggerated "goose-stepping" gait. An exaggerated contraction of the diaphragm may also occur. Horses that survive at least 24 hours may strain frequently and void small amounts of darkened urine (blood in urine). Any horse showing these symptoms should be promptly examined by a veterinarian and the forage inspected for presence of blister beetles. Autopsies may be performed on animals that die after consuming legume hay.